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Of temporality and plurality: an epistemic and governance agenda for accelerating just transitions for energy access and sustainable development

Laurence L Delina[1] and Benjamin K Sovacool[2]

Abstract

The complementarity of sustainable energy transitions and energy access provision are one of the key characteristics of both the Sustainable Development Goals and the Paris Agreement on climate change. In this perspective piece, we offer an epistemic and governance agenda to advance the imperative of speed in meeting both ambitions and to acknowledge the plurality of disciplines, actors, and institutions involved. Recognizing that the processes required to achieve these global goals entail navigating tensions, we suggest that shifts in ways knowledge is produced and transitions are governed could be based on a justice framework.

Addresses
[1] Frederick S. Pardee Center for the Study of the Longer-Range Future, Boston University, United States
[2] SPRU-Science Policy Research Unit, University of Sussex, United Kingdom

Corresponding author: Delina, Laurence L (ldelina@bu.edu)

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Introduction

Sustainable energy transitions and energy access provision are important *modus operandi* for achieving not only sustainable development goals but also for meeting international commitments for climate change mitigation. Energy access is underlined in the Agenda 2030 (or the Sustainable Development Goals or, henceforth, SDGs), particularly SDG 7, while energy transition is highlighted in the Paris Agreement on climate change, as well as in SDG 13. Both SDGs inarguably have key contributions in meeting the other fifteen SDGs. It is imperative, therefore, that current and future scholarship advances our understanding of how different governance structures affect both the implementation of energy transitions and the expansion of energy access [1]. Pursuing them together leads to a harvest of both development and climate dividends [2••].

Yet, this is not an easy pursuit. Energy transitions and expanded energy access provision require necessary shifts away from conventional practices and thus will more likely be contentious. A new epistemic and governance agenda becomes more relevant when temporality — i.e. the need to speed up action — and plurality — i.e. the multiplicity of knowledge and expertise, actors and institutions involved — are included in the equation. Navigating this messiness entails a multidisciplinary effort to knowledge-making and polycentric governance approaches, and, as this article further suggests, a justice-based framework [3–5,49••].

To more systematically explore this agenda, this article begins by highlighting the imperative of speed. In the next section, we focus on how scholars and practitioners *ought* to navigate the multiple challenges of providing new knowledge and governing energy transitions and access provision. Here, we suggest that an embrace of differences and multiplicities would be necessary highlighting the key points to consider in a multidisciplinary approach to knowledge-making and a polycentric approach to governing. Recognizing the imperative of plurality, while acknowledging polarities and divergences, our final section offers a justice framework as a construct for navigating this proposed agenda.

Temporality: the imperative of speed

In September 2015, the United Nations (UN) historically issued a global agenda for sustainable development with people, planet, and prosperity at its core. The SDGs, as they are called, comprise a set of 17 goals that need to be met by 2030. Just three months later, the community of nations (via the UN Framework Convention on Climate Change) also agreed to collectively address the global challenge of anthropogenic climate change by pledging national emissions reductions. The Paris Agreement, although it does not set a date when significant reductions have to occur, recognizes the urgency of climate action and emphasizes the enduring benefits of ambitious and early action.

Although not intuitively obvious, both international agendas complement each other. On one hand, SDG 7 requires an increase in the share of renewable energy and energy

efficiency, side-by-side with universal energy access, while SDG 13 speaks about combatting climate change by fostering low carbon development, mitigation, and technology transfer. On the other hand, the Paris Agreement acknowledges the need to promote universal access to sustainable energy through the deployment of renewable energy. A focus on speeding up both energy transitions and access provision, thus, has to influence both scholarly and policy debates but with careful attention paid to specific contexts, particularly various dimensions (e.g. organizational, spatial, temporal), scales (e.g. local, regional, national, international), and policies (supply side, demand side, restrictive, supportive) [6–9].

Sustainable energy transitions require tectonic shifts in the mobilization of necessary resources, both the technological hardware and the non-technical solutions, across levels and spaces ([10]; cf. [11••]). Many of the technologies required in the transition are market-ready — and will be, in the short term, more accessible and affordable for many developing countries. Falling technology cost, the economies of scale, public preference for sustainable solutions, the associated benefits to health, education, the economy and inclusiveness are expected to drive the speed of the transition. Studies also show that more important drivers to spur economies of scale include policy support and government targets, a cooperative private sector, and a willing public (cf. [10,12,13]). These preconditions have allowed the acceleration of recent energy transitions in less time versus past energy transitions [52•,14••].

Depending on level and scale, most of the rapid transitions observed have occurred in terms of specific fuel (e.g. kerosene to LPG in Indonesia) and specific geographical space (e.g. zero coal in Ontario). Some countries have already adopted a 100% renewable energy target, whilst transition roadmaps towards this target have been envisaged for most countries [15]. Some countries already adopted it as national targets (e.g. the Cook Islands, Niue, Papua New Guinea, Samoa, Tokelau, Tuvalu, and Vanuatu). The big issue that remains largely unaddressed, however, is how major emitting countries in the global South could bring their transitions up to speed [2••]. The destructive impacts of climate change, alongside increasing population, expanding urbanization, and changing consumption habits, also *ought* to be considered.

In the electricity access front, grid extension, falling technology cost, policy support, and availability of financing, among others, have been closing gaps. The International Energy Agency [16] reports access improvements in South Asia, which along with sub-Saharan Africa, is amongst the world's regions in dire need of modern energy access. In India, significant strides in improving access were made in 2016 when electricity reached 82% of the population, about half a billion people, up from 43% in 2000. However, by 2030, the IEA expects that 674 million people will still be without access to electricity, including 600 million in sub-Saharan Africa. Achieving the universal energy access ambition will, therefore, be a rough climb.

Yet, policy and programs also have been evolving to directly address these gaps. The IEA (2017) continues to recognize the prominent role of grid extension, but has also valued the role of distributed, mainly renewable energy systems, as options for off-grid access. The Agency also puts a premium on the role of energy efficiency, particularly appliances, in meeting this ambition. Although this way forward is a welcome note in the development front, the grid option could raise a particular climate-related question especially when future grid extensions are not exclusively renewable energy-powered. Locking in developing countries with fossil fuel-powered systems jeopardises not only their climate commitments but also our collective sustainable development [2••]. This opens up an unnecessary tension about which has to be given deference: development or climate?

Governing these processes is, therefore, not an easy task. Embedded questions persist related to responsible innovation, institutions and governance, international development, and morality and ethics. Responding to these critical questions would require simultaneous shifts not only in governing the deployment of the transition hardware but also in terms of producing high-quality knowledge. The socio-technicality of energy systems requires that energy scholarship has to move beyond its focus on techno-economic approaches, and that the diversity of options and voices has to be respected when governing. Temporally, it requires a focus on urgency and better grappling with 'contested timelines' of transition processes [17].

Plurality: understanding and governing diversity

The plurality of the ways to understand and govern sustainable energy transitions and energy access provision arises from the multiple aspects that need to be considered and systematically scrutinized, and the activities and interests of actors and institutions involved ([18]; [48••]; [19•]). Given this heterogeneity, producing new knowledge, developing interventions, making decisions, implementing solutions, and monitoring initiatives would be always highly contested (cf. [20]). Nonetheless, plurality should be welcomed for the opportunity to bring about multiple approaches that could lead to plausible pathways for meaningful change.

The first necessary shift is focused on how knowledge about energy systems is produced. This shift needs to highlight flexibility, dynamism, and adaptability [21], at the same time that it is informed by all applicable

epistemic traditions, not only from engineering (the technical) and economics (the financial), but also from other relevant social sciences [22••,23]. As scholars ask a multitude of questions to understand the multiple natures of energy systems, bridging relevant fields of inquiry is also of utmost importance. Inter-disciplinarity, trans-disciplinarity, and multi-disciplinarity[1] cover more ground compared to an understanding based solely on one discipline. A nested approach to knowledge-making also reduces the risks of missing the opportunities to have that discipline's weaknesses addressed by other competent fields of inquiry [22••]. As scholars ask their questions, it is prudent to consider the strengths and weaknesses of their disciplinary approaches, and their complementarities and contradictions. As several underpinning disciplines generate new knowledge, we will have access to insightful comprehension of the complexities of the challenges. Bridging knowledge and action, however, is often a challenging, yet threadable, terrain [24,25••,26].

In considering this knowledge–action interface, it is essential to consider the processes surrounding: (1) the matching of research outputs with the practical interests of policymakers, business people, and other research end-users; (2) the inclusion of insights beyond the engineering and economic disciplines in decision-making; (3) the coupling of quantitative and qualitative energy research insights; (4) the improvement of costly and complex qualitative energy researches; and (5) the design of decision-making exercises that highlight, rather than erase, the contributions of alternative epistemologies, particularly lay knowledge[2].

The second shift is focused on how institutions (e.g. organizations, regulators, markets, and so on) are arranged in response to the multiplicity of knowledge produced about the sociotechnicality of energy systems (cf. [11••]) and the multiplicity of its stakeholders and organizational arrangements [22••]. Recognising plurality and its resulting complexities in governing energy systems would further require reflexive, coordinated, multi-sectoral, multi-level, and inclusive interactions amongst its stakeholders ([27,28••,29••,30,31]). Aspects to consider when navigating these processes include the required shifts in technologies and their deployment, policy design, financing mechanisms, and the arrangement of institutions themselves, or in other words, governing [2••]. Governance, broadly, is about deciding who can do what, who will monitor it, and how rules are modified over time [32].

A governance shift is necessary given the diversity of stakeholders and their locations in the multi-level system. This entails the recognition and understanding that the processes of transition and access provision will likely be governed in a polycentric arrangement [33]. A polycentric approach to governance refers to when citizens simultaneously organize themselves into multiple authorities at various scales, where power is shared across these scales, resulting in overlapping jurisdictions [32,34•].

A key point to consider with polycentric decision-making, thus, is about designing processes or exercises that opens up to, includes, and engages not just the usual participants but also the habitually excluded actors and their interests [35]. In energy transitions and energy access provision, where efforts happen across many pockets of governance, this entails enrolling all relevant stakeholders, including the historically marginalized, and coordinating their many efforts [33]. Many women, for example, remain disproportionately affected by lack of opportunities to fully participate in the transition, inasmuch as they lack access to basic energy services [36,37]. Addressing this inequality — through a recognition and understanding of their needs, priorities, and aspirations — is more likely to have a significant impact on addressing both household and community energy poverty and gender equality [38], hence must be strongly supported. An effective and coherent, yet just, approach to these processes is essential to ensure better outcomes, although, of course, success could never be guaranteed.

Bridging is key in scaling up and accelerating energy transitions and energy access provision [39,40]. This system approach requires the enabling and strengthening of working coalitions, partnerships, and networks across a variety of actors [41]. There are already a number of examples showing that this can be done (e.g. amongst cities and local governments), but we need more horizontal and vertical interconnections across our institutions, especially those focusing on energy transitions (e.g. the Transitions Towns network in the global North) and energy access provision (e.g. Global Alliance for Cleaner Cookstoves).

Given the scope of the required shifts in both processes of knowledge-making and governing, a coherent framework would be necessary to better navigate these shifts. The concept of justice offers a way forward.

Humanizing transitions: towards a justice framework

Most important for the realisation of both the SDGs and the Paris Agreement is to strive for a just future that

[1] Following Rosenfield [50], multidisciplinarity can mean researchers working in parallel or sequentially from disciplinary-specific bases to address common problems; interdisciplinarity can mean researchers working jointly but still from disciplinary-specific basis to address a common problem; and transdisciplinarity can mean researchers working jointly using a shared conceptual framework that draws together concepts and approaches from parent disciplines and creates new frameworks that break down traditional boundaries of the disciplines.

[2] Following Collins and Evans [47], p. 238, lay or local knowledge pertains to knowledge produced by 'members of the public who have technical expertise in virtue of experience that is not recognized by degrees or other certificates.'

Table 1

Energy justice conceptual framework

Principle	Explanation
Availability	People deserve sufficient energy resources of high quality.
Affordability	All people, including the poor, should pay no more than 10?percent of their income for energy services.
Due process	Countries should respect due process and human rights in their production and use of energy.
Transparency and accountability	All people should have access to high-quality information about energy and the environment and fair, transparent, and accountable forms of energy decision-making.
Sustainability	Energy resources should not be depleted too quickly.
Intragenerational equity	All people have a right to fairly access energy services.
Intergenerational equity	Future generations have a right to enjoy a good life undisturbed by the damage our energy systems inflict on the world today.
Responsibility	All nations have a responsibility to protect the natural environment and minimize energy-related environmental threats.
Resistance	Energy injustices must be actively, deliberately opposed.
Respect	Intersectional differences in knowledge and epistemic upbringing, culture and experience, and race and gender have to be respected in energy decision-making.

Source: Modified from Ref. [53••], p. 687.

includes everyone. This, essentially, means that energy transitions are 'humanized' [3]. A focus on justice necessitates comprehensive interventions that recognize and appreciate the heterogeneity of the processes and actors involved in knowledge-making and governing. A justice agenda entails holistic and reflexive processes, mechanisms, and exercises framed around inclusiveness and strong public engagement. People-centric governance approaches, those that place human development at their core, are key. Sovacool and Dworkin [42] offer multi-principled energy justice framework that could translate these normative directions into practice (see Table 1). In this article, we offer an additional principle: respect.

Respect (a form of appreciating and recognizing the intersectionality of concerns) underlines forms, approaches, and exercises to solicit inclusive, authentic, and influential public participation and engagement on deliberation of energy issues (cf. [43,44]). Guarantees of mutual respect allows participants in deliberation, regardless of their identities, to accept multiple, yet inevitable, openings and closures that exist as we imagine these new social orders [45]. Deliberation based on respect, in turn, builds and cultivates trust, which is a key feature in a polycentric approach to governance [29••] and that even result in higher cooperation levels [30]. The ten-principled energy justice framework embeds the many notions of justice [46••], including distributive justice, procedural justice, justice as an outcome, justice as due process, justice as fairness, and justice as recognition. With plurality inherent in knowledge-making and governing, this justice-based framework is also multifaceted inasmuch as its principles are also interrelated [46••].

Within this justice framework, some key tensions surrounding knowledge-making around energy systems and energy system governance could now be ably addressed. These include, among others: (1) the selection of sustainable energy systems that would empower those with less in life and address inequality, deprivation, and poverty; (2) the design of fair, just, and non-paternalistic technology, financing, and capacity transfer; (3) the assurance that resources that are environmentally benign, culturally respectful, and offers more benefits than risks are given premium in decision-making; (4) the design of decision-making processes such that the processes account for social justice and the sustainability of resources for future generation; and (5) the assurance of fair distribution of the costs and benefits.

Conclusion

By electing to embed the issues of speed and plurality in the quest for meeting the global ambitions of energy transitions and universal energy access, this perspective piece is meant to spur further scholarly and policy discussions. Our motivation is to lay out critical points for a new epistemic and governance agenda, which go beyond the techno-economic focus in conventional analyses. We also seek an agenda that is guided by the multidimensionality, and the processes that are generated, distributed, and used as energy services. These sociotechnical energy systems, produced across a variety of levels and spaces, need to be understood using multiple approaches for generating new knowledge and to be governed as a polycentric system. Navigating the shifts needed to achieve these new ideals, as we have argued in this article, may necessitate transformations in the practice of knowledge-making and governing. This reminds us that the processes of both energy transition and access require not only harmonizing sociotechnical systems, but epistemically bridging disciplines and building cognitive resources as well.

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